DOCUMENT RESUME

ED 295 380 EC 202 818

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TITLE An Analysis of One of the Cornerstones of the Regular Education Initiative.
PUB DATE [87]
NOTE 31p.
PUB TYPE Information Analyses (070) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Disabilities; *Educational Innovation; *Educational Research; Elementary Education; Grade 2; *Mainstreaming; Research Design; Research Methodology; *Research Problems; Special Education
IDENTIFIERS *Adaptive Learning Environments Model; *Regular and Special Education Cooperation; Wang (Margaret); Will (Madeleine)

ABSTRACT

The "regular education initiative," whose chief proponent is Assistant Secretary of Education Madeleine Will, calls for the merger of special education and regular education into one system. It is based on the Adaptive Learning Environment Model (ALEM) developed by Margaret Wang and her associates. This paper reviews the research, including pilot studies, conducted by Wang and others in order to aid regular and special educators in assessing the regular education initiative. It concludes that the ALEM may provide effective mainstreaming technology, but that the research examined does not necessarily verify it. ALEM appears to be a highly implementable model of effective teaching in a regular classroom setting with average learners through second grade, but the research has not: (1) demonstrated effectiveness of ALEM with learners defined as "handicapped" under PL 94-142, the Education for All Handicapped Children Act; (2) investigated setting as a variable and therefore shown it as more effective than resource or other special-setting classes; (3) investigated the variance gained or maintained past grade 2; (4) investigated variance accounted for by level of task difficulty or use of self-instructional materials; or (5) always employed the best research practices in terms of statistical analysis, control groups, and sample size. A 34-item reference list is appended. (VW)

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An Analysis of One of the Cornerstones of the Regular Education Initiative

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Running head: REGULAR EDUCATION INITIATIVE

Abstract

Madeline Will has articulated a movement which would combine much of special and regular education into one system. Such an approach is referred to in the literature as the regular education initiative. This concept is based in large part on the writings of Margaret Wang and on the ALEM (Alternative Learning Environment Model) model. This paper analyzes the research and writings of Wang and others to aid regular and special educators in assessing the regular education initiative. The article offers guidelines for what ALEM is and is not.

An Analysis of One of the Cornerstones of the Regular Education Initiative

In recent years there have been calls for improving the interfacing of regular education and special education (Greenburg, 1987). Some of the advocates have called for a merging of special education and regular education into one system (Lilly, 1986; Stainback & Stainback, 1984).

It is hard to look at the special education delivery systems and the legal concept of least restrictive environment and not to see that special and regular education are two systems which must have a close working relationship and be more unified than they have been before. The purpose of this article, however, is not to debate the regular education initiative or the interfacing of regular and special education. Instead this article looks at some of the basis for the original proposal.

The torch bearer for this movement seems to have been Madeline Will (1984, 1985). As Assistant Secretary of Education WIll, articulated the need for regular education and special education to be combined with the local school principal being empowered as the

instructional leader. Some (Robson, 1981 from Greenberg, 1987) suggest that this arrangement has been approached in the job roles of principals. Will made her proposal for the "Regular Education Initiative" in speeches and in journal articles. She likewise established policy, including a National Task Force to Advance the Regular Education Initiative, on which Margaret Wang serves, to facilitate interfacing special education and regular education (Education of the Handicapped, 1987). While Will has been considered the initiator of the concept, the literature reveals that the influence of Wang and her associates was paramount in shaping Will's thinking. In fact Wang's Adaptive Learning Environment Model (ALEM) has been central to Will's regular education initiative movement (Wang & Reynolds, 1985). The development of the model was funded by the Office of Special Education and Rehabilitation and by the National Follow Through Program (dealing with disadvantaged children's education).

What is ALEM?

Wang's model has been described as..."the case of successful merger of special and general education services in regular classes" (Wang & Reynolds, 1985, p.498). The ALEM represents possibly the most extensive synthesis and operationalization of the literature concerning effective teaching to date. It is apparently easy and economical to implement. The model appears to contribute substantially to change in behaviors of both teachers and students which are directly related to achievement in average and above average learners. To evaluate the model accurately it is necessary to trace the development to its present state. Once the development has been reconstructed, it is necessary to examine the work with a discerning eye.

The present model, ALEM, appears to synthesize and oeprationalize that body of work known as effective teaching literature reaching back to Bloom's work (Bloom, 1976). "The basic elements [of this model] include (a) detailed sequences of behavioral objectives which define the abilities that each pupil is to acquire, (b) study materials that are largely self-instructional in nature, to teach each objective, (c) a

testing program for placing each pupil at the proper point in the curriculum sequence and for monitoring his progress, and (d) classroom management procedures that permit each pupil to proceed at a rate best suited to his needs" (Wang, 1970, p. 36).

Development of ALEM

The earliest elements of the ALEM are in a 1970 study involving four different rates of learning formulas. That same work included three distinctive variables concerned with rate of learning (Wang, 1970). The conclusion was that rate of learning is not consistent over all materials. "It may be concluded that rate of learning is specific to a given task and is not a general factor characterizing student performance in all learning situations" (p. 45).

In 1971 (Wang, 1971; Wang, Resnick & Boozer, 1971) a scalogram analysis was developed of heirarchal math behaviors. There were differences in populations between the 1970 and 1971 studies but methodology, measures and results are similar enough to be considered together. The result was a meticulously constructed heirarchy for mathematics curriculum development in young children. One study reported a population of pre-

kindergarten through first grade (Wang, 1971). Another reports only kindergarten children (Wang, Resnick & Boozer, 1971). Whether this latter group is a breakout from the first only Wang would be able to ascertain without examination of the original data. A third article is not precise concerning population (Resnick, Wang & Kaplan, 1973).

In 1973 Wang studied the accuracy of teacher's predictions of children's learning performance. She found (Wang, 1973a) that teachers' predictive accuracy increased with feedback from the child's actual scores. This may well be the influencing factor for the high degree of maintenance of a strong data base in the ALEM. The data were collected on two teachers in a developmental elementary school. One taught 12 four year olds and the other taught 13 kindergarten children.

In that same year, Wang (Wang, 1973b) studied verbal prompting with preschool children from disadvantaged backgrounds. She was able to separate the more effective questions for increasing these children's descriptive language. This particular behavior does not appear in the later model. These data were collected from 19 five year olds.

The problems of passive learners were the focus of a 1976 study (Wang & Stiles, 1976). During this work the Self-Schedule System was developed along with its measure the Self-Responsibility Interview Schedule (SRIS). Both these items are prominent features in the full ALEM model. The impact of self-scheduling was reiterated in Levine & Wang (1983).

Rate of learning returns as a prominent feature in the 1976 work on the model (Wang & Stiles, 1976). Added to the varaiables in that study were student perceptions of self-responsibility for school learning and student perceptions of locus of control for intellectual and school achievement. These were important additions to the nucleus of the model. Higher correlations for task completion on self-scheduled tasks were found and higher perceptions of student responsibility and control in self-scheduled tasks were added to the model. It is only in much later descriptions of this work that the differences in task demands and levels were discussed (Levine & Wang, 1983). Twenty-one second-graders served as subjects.

Also in 1976 (Wang) self-scheduling was added to prescriptive tasks (tasks required by the teacher before

"extended" activities could be available). This study showed a decrease in student waiting for teacher attention. A later assessment of this work viewed it less optimistically: "Narrative recordings of students' classroom behaviors were used to examine the extent to which students utilized their peers as resourses, especially when they failed to get the assistance they needed from teachers" (Levine & Wang, 1983, p.239). Work in group settings increased and student disagreement decreased. A corresponding increase in parallel rather than interactive exchanges between students also occurred. Student-teacher interaction decreased as well but since the foundations of the model concerned itself with materials which were "largely self-instructional in nature" (Wang, 1970, p. 36); that decrease was perceived as encouraging. Although some of this early observational data were based on biased questions (Wang, 1976, p. 368), the technique was modified later to present more behavioral information with less subjectivity. The 1976 population was a first grade class (N=25) from low socio-economic, inner city families.

Wang (1979) described implementation of these two new features: self-scheduling and measures of self-responsibility for learning. The setting (which is not a variable) was a developmental school for the Learning Research and Development Center for inner city, lower socio-economic children from black families. The subjects were 21 second graders. It is unclear whether these were the same subjects in the earlier work on these same variables (Wang & Stiles, 1976). Increased task completion and on-task behaviors were the dependent variables. Increases of task completion on self-scheduled tasks and perception of self-responsibility for learning were demonstrated.

In a pilot study (Wang, 1981) the ALEM was employed in "a multi-age primary classroom, where the enrollment included low and high achievers" (p. 205). Of the 45 children, aged 5 years through 8 years, 4 were low achievers (at or below the twenty-fifth percentile) and 8 were high achievers (at or above the ninetieth percentile). The low achievers were described as identified with a criteria "similar" (p. 205) to those used to identify learning disabled children. "Children categorized as LD generally are those with IQ scores of

85 or above, who are diagnosed as within the normal limits of auditory and visual acuity and social-emotional adjustment, and whose standardized achievement scores are at or below the twenty-fifth percentile." (p. 205). The full extent of similarities was not described. Twice in that article,. the author warned against the generalizability of the findings pointing to the "very narrow range of exceptionalities that identify the candidates for enrollment in mainstreaming classes" (p. 206) and the lack of a matched control group.

The pilot study is of considerable interest to the model in that it added two new elements. The new elements are narrative descriptions of the child's behavior and a systematic observation schedule. The behaviors reported in this study are the same ones which appear in the 1984 version of the ALEM and will be considered in more detail there.

When the achievement scores were reported, the findings increase confusion. In the original population description, no grade levels were mentioned, only chronological ages. When the achievement scores were reported, they were grouped in grade levels. The change in measures confuses the findings, making them difficult

to interpret. At this same point, comparisons were introduced between these children and children from other classes (p. 209). This despite the fact that the researcher had described no comparison, contrast or control groups prior to that point.

This study (Wang, 1981) may be an extraction of data from another study reported elsewhere (Levine & Wang, 1983; Wang & Birch, 1984a, 1984b; Wang, Nojan, Strom & Walberg, 1984; Wang & Walberg, 1983a, 1983b). It may be a case of publication of the least publishable unit but that appears not to be the case. Synthesizing the reports is defensible in that the populations, variables, measures and chronological settings apear to be the same. While duplicate reporting of studies is often confusing, combining all these reports provides a clearer picture of the same project.

The ALEM model has been tested with early grade levels. It has been shown to be easily implemented with high rates of implementation (85% was the criteria set by Wang). It has been shown to contain behaviors which are supported by literature as contributing to efficient learning among average learners (Peterson & Walberg, 1979). It has been shown to contribute to variance

which reduces disruptive behavior (Wang, 1976, 1979; Wang & Walberg, 1983; Wang, Peverly & Randolph, 1984; Wang & Birch, 1984a; Wang & Peverly, 1986; Wang, 1987). "Handicapped" learners appear not to initiate teacher interactions as often. They appear to spend more time engaged in parallel activities rather than interaction with other students. They appear to spend less time waiting for teacher attention on the fewer interactions. The reading and math levels showed progress of over one year's growth at the end of the school year (Wang & Birch, 1984a, 1984b; Wang, Nojan, Strom & Walberg, 1984; Wang & Walberg, 1983b). The 1983 report of these studies (Levine & Wang, 1983) does not describe the handicapped learners though it is possible the data offered originated in studies previously described (Wang & Birch, 1984a, 1984b; Wang, Nojan, Strom & Walberg, 1984; Wang & Walberg, 1983). In the Levine and Wang report (1983, pp. 222-243) only "low achievers" were mentioned.

The two Wang and Birch reports (both in 1984) began to describe the ALEM as a mainstream alternative to resource rooms (Wang & Birch, 1984a, 1984b). Still no

true experimental comparison studies were introduced but it was theorized that the application could be made.

The ALEM is without question effective with average learners and with kindergarten through third grade. The 1980-81 and 1982-83 studies were clear in this regard (Wang, 1981; Wang & Birch, 1984a, 1984b; Wang, Jojan, Strom & Walberg, 11984; Wang & Reynolds, 1985; Wang & Walberg, 1983). Despite Wang's assertion that "...the purpose was to examine the ALEM's impact on student achievement and not to make cross-site comparisons..." (Wang & Birch, 1984a, p. 395); the ALEM has been posited as a definitive model of successful mainstreaming of mildly handicapped children (Wang & Walberg, 1983).

The 1982-83 school year studies consist of "26 mainsteraming classrooms in five public shcools located in three districts of a large urban school system" (Wang, Peverly & Randolph, 1983) and "28 teachers from five elementary schools" (Wang & Reynolds, 1985). The total number of students is unclear in both those articles. The variables for both studies are degree of implementation, amount of learning behavior change and end-of-year achievement scores. That they may represent the same study is evidenced in change score results on

achievement tests and per cent of students "recommended for decertification" (Wang, Peverly & Randolph, 1984, p. 25; Wang & Reynolds, 1985, p. 499). Duplicate results so seldom occur in the behavioral sciences that the assumption of duplication of publication may be understood though the differences in number of teachers is puzzling.

The studies reported here show the active research and writing of Wang and her associates from 1970 to the present. The literature suggests that the ALEM model has been evolutionary.

Population

The descriptors of the populations with the ALEM are clear on only a few points. It is clear that the ALEM produces differences in achievement results and behavior patterns in inner city, black underachievers, economically deprived and the gifted. The extent of handicapped children's involvement in these studies is unclear. Reference is made to children who were "similar" to children with learning disabilities (Wang, 1981, p. 205). The dissimilarities, however, would have provided more pertinent information.

It is also clear that the learners in these studies

were for the most part first and second graders with a few kindergarten and pre-kindergarten children in some of the early writings. Demonstrations of experimental comparison, experimental contrast and control groups were not always provided. That deficit was commented on by Wang (1970, 1981). In the one study where two comparison groups are mentioned there is no way to ascertain if tasks of similar length and difficulty were involved. The importance of that lack can be found in Levine & Wang's 1983 description. In publications beyond the original reports of data, the details of these possibly post facto comparison groups increase in prominence.

Beyond this age group (second grade), we are unable to determine applicability. Although the program was in effect from 1978 to 1983 and continues to be implemented in new settings (Wang, 1987b), no followup was reported as the children progressed in their academic experiences. One aside (Wang, 1984) says gains were consistent for two years after the children's initial involvement but the published data confounds that claim. In the group described as having gains after two years, there were twice as many gifted as

there were "low achievers" (p. 205). This is the same group where the "low achievers" were later described as being "similar" to learning disabled. Their similarity may not have been sufficient to convince the funding agency of their "handicap" either (Wang & Reynolds, 1985, p. 500).

The age group which Wang studied was engaged in acquisition of basic foundational skills which include high drill frequency. These skills lend themselves well to self-instructional materials. This was true in the ALEM application as well. "Teachers tended to assign more review tasks and smaller tasks (e.g. fewer workbook pages) to low achievement expectancy students than to students in the other two groups" (Levine & Wang, 1983, p. 241).

In that study teacher expectations were one of the variables reported. "Since students from all groups displayed similar progress during the school year, the relative positions of the groups [placement on the achievement continuum] at the beginning of the school year remained unchanged at the end of the year." (Levine & Wang, p. 242). This would seem to indicate that student achievement under the ALEM, in terms of

relationship to the average population, may be similar to student achievement under other regular education programs.

Since the ALEM is being recommended as a model for successfully combining special and regular education, some caution must be used in its generalizability beyond the second grade. Task demands later become more complex and of a different nature. These factors could raise serious questions concerning the effectiveness of the model beyond the second grade level.

There are suggestions in a few of Wang's studies that problems requiring additional services or strategies have those services available using the ALEM (Wang & Birch, 1984a). Again, no data are given.

Although it is reported that "recommendation" for exit from special education certification was at a 30% level, no exits were reported. Certainly such an important followup should have been implemented whether or not the final rate of exit was in agreement with the recommendations. This would have been especially critical when funding was in jeopardy (Wang & Reynolds, 1985, p. 500).

Setting

Although the ALEM is heralded as a mainstreaming technique which provides better results for mildly handicapped learners than special education settings (Wang & Birch, 1984a), none of the articles describing the ALEM implementations had setting as a variable. Rather the variables in the model at completion were implementability, student behaviors, student perception of self-reponsibility for learning and staff development (Wang & Gennari, 1983).

Variables

As important as the lack of a setting variable is, the lack of examination of the self-instructional materials as a contributor of variance in student performance deserves equal attention. Several questions come to mind. Does that mean the ALEM would work as well with traditional materials? How were these materials different? How much of the variance in student behaviors, such as change in achievement scores, was accounted for by the materials used?

Wang, herself, apparently had some questions of her own on this topic before becoming involved in the regular education initiative trend. "When used in

classroom research, the data from the heirarchy tests must be interpreted with some caution due to the unequal difficulty of the units." (Resnick, Wang & Kaplan, 1973, p. 708). The research report, from which this statement was taken, targeted the sequence of math skills development later used to develop the sequences of math skills for materials used in the ALEM.

Methodology

The examination of change in achievement scores as a functional relationship of the ALEM implementation was accomplished using regression techniques. These techniques are most appropriately used for prediction and group membership.

There are other statistical techniques which are used to build models. While regression has been called the workhorse of statistics, it is not appropriate for use in making causal statements. Factor analysis (a more appropriate statistic for developing models) was not mentioned though canonical regression was used to study rate of learning during the earliest stages of the model's evolution (Wang, 1970). Causal statements were made based on regression results (Wang & Walberg, 1983). Mosteller and Tukey (1977) were referred to, in that

article, but inappropriately. These two statisticians, in that text, list three ideas required to support causality: consistency, responsiveness and mechanism (p. 260).

An examination of the observation data offered shows each student was observed an average of 4.9789621 minutes per year. Each classroom was observed an average of 1.6666 hours per year. The reported interrater reliability (in the 80's) is not quite as impressive when the total reported observation times are broken down into per student, per classroom segments (Wang, 1981).

Conclusions

It is quite possible that the ALEM in total or in part may provide effective mainstreaming technology. However, the research examined herein does not verify that. The model, itself, is a consistent, highly implementable model of effective teaching in a regular classroom setting with average learners through second grade. Average learners are considered to be those which do not meet legislative guidelines as handicapped no matter how many other learning inhibitory factors may exist for them. The processes employed in the ALEM are

consistent with available literature on average learners. The results substantiate their usefulness in the kinds of behavior changes labeled learning.

There are also some things this research has not done. It has not:

(1) demonstrated use with learners which, under Pl 94-142 or other subsequent legislation, are called "handicapped".

(2) investigated setting as a variable and so cannot be described as more effective than resource or other special setting classes.

(3) investigated the variance gained or maintained in grades past the second grade (concrete level of learning). Wang (1987b) noted that "some" data existed for fourth grade, "quite a lot" for the upper levels of high school and "a little" for middle school. She admitted none of this data had been published but "probably should be" nor did she elaborate on the results derived from those data.

(4) investigated the variance accounted for by level of task difficulty.

(5) provided any data on the amount of variance

provided within the implementation of the ALEM by the self-instructional materials used.

(6) used the data gathered in the studies in a way consistent with best use and practice of statistical data evaluation.

(7) consistently used randomly assigned control or contrast groups as part of the a priori design.

(8) utilized adequate samples.

These are all serious flaws in a body of meticulously investigated work. They prohibit the widespread application of the model for the purpose of replacing current special education service models. The flaws also prohibit the assumption that implementation would be appropriate for all grade levels.

That is not to say that the model would not improve the teaching preactices in the regular classroom at the levels on which data were reported. Nor is that to assume that the model would not improve instruction to some degree for all learners. Certainly in the years for which demonstration has been provided, it did improve the lot of the unserved and unclassfified or non-handicapped underachievers. The ALEM might even allow for improved curricular changes in resource

settings to provide the teacher consultation and compensatory skills and strategy training which the impaired learner requires by providing needed remediation in the regular classroom setting.

Hopefully this analysis of studies related to the ALEM will allow special and regular educators better to evaluate the pros and cons of the regular education inititative if over reliance is being placed on this model in developing educational policy.

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